

REMARKS

Claims 1-3 and 22-28 are presently pending in the above-identified patent application. Claims 1, 3, and 25 have been allowed.

Claims 22-24 and 26-28 have been rejected pursuant to 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. According to the examiner, these claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors had possession of the claimed invention at the time the application was filed.

This rejection is respectfully traversed. It is respectfully submitted that the subject matter of claims 22-24 and 26-28 is described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors had possession of the claimed invention at the time the application was filed.

The examiner's reasoning includes the necessarily mistaken assumption that neither the inventors nor other persons of ordinary skill in the art would know that the same readout circuits are used for each of the colors in the three-color pixel depicted in FIG. 2 of the application. This assumption is completely untenable in light of the disclosure quoted below from paragraphs [0007], [0025], and [0026] of the specification.

First, at paragraph [0007] the specification, describing the prior art, states (emphasis added):

[0007] One example of a typical circuit that can be used for detecting charge in the particular n+ type diffusion node is shown as a schematic in FIG. 1. The circuit consists of reset transistor 117 that connects charge detection node 115 to reference voltage terminal 119 when a suitable reset level is applied to gate 118. Photo-generated charge accumulating on node 115 causes a voltage charge that is buffered by transistor 116 with its drain connected to Vdd bias terminal 120. The output signal then appears on node 121 and can be further processed either as a voltage or as a current when supplied to the rest of the sensor circuitry. Circuit ground 122 is identical to p+ type doped substrate 101. *For simplicity, only one schematic circuit is shown, although there are typically three for a single pixel sensing three colors.* It would be apparent to those skilled in the art that other, more complex circuits can be connected to pixel 100.

Further, in disclosing the invention, paragraphs [0025] and [0026] of the specification state (emphasis added):

[0025] The remainder of pixel 200 operates in a manner similar to pixel 100. Oxide dielectric layer 210, channel stops 209, metal contacts 211, 212, and 213, together with wiring 214 serve the same purpose in pixel 200 as in pixel 100. *Also, pixel 200 is the same with reset and buffer transistors 217 and 216 respectively, reset gate terminal 218, reference voltage terminal 219, Vdd bias terminal 220, and output terminal 221.* The circuit ground is terminal 222.

[0026] The metal interconnects and various circuit elements that also belong to pixel 200 are for simplicity shown only schematically and some elements are completely omitted. *For example, only the schematic components connected to plug 208 are illustrated, for simplicity.*

Taken together, paragraphs [0007], [0025], and [0026] make unequivocally clear that readout circuitry (comprising reset transistor 217 and source follower transistor 216) is connected to all of the photocollectors, not only to the photocollector

connected to plug 208 on line 214. The output connections from the other two color photocollectors are also labeled with reference numeral 214. No other result would make any sense to a person of ordinary skill in the art, who must be presumed to know that the other photocollectors in the embodiment of FIG. 2 would be useless if there was no provision for reading out charge from them.

Paragraph [0007] makes it unequivocally clear that the same readout circuitry is used for all colors in prior-art three-color pixels. Paragraphs [0025], and [0026] make it unequivocally clear that pixel 200 of FIG. 2 operates in the same manner as pixel 100 of FIG. 1 with respect to details such as the charge readout. Paragraph [0026] specifically states (emphasis added) *“For example, only the schematic components connected to plug 208 are illustrated, for simplicity.”* Those components are the reset transistor 217 and the source-follower amplifier transistor 216. Given this disclosure, no person of ordinary skill in the art would fail to appreciate that the specification and drawings contemplate the use of a reset and amplifier transistor are used for each color photocollector.

With respect to the disclosure of the embodiment shown in FIG. 4, the disclosure in paragraph [0033] makes it equally clear and unambiguous that readout-amplifier and reset transistors are used for all colors (emphasis added):

[0033] The remainder of the structure is similar to the previous example. P+ type doped channel stop regions 409 separate n+ type charge detection node junctions 406, 407, and 408 from each other. Detection node junctions 406, 407,

and 408 are connected to metallization regions 411, 412, and 413 through contact holes opened in oxide dielectric layer 410. *Wires 414 are used for interconnecting detection node junctions 406, 407 and 408 with the rest of the circuit components of pixel 400, such as reset transistor 417 and buffer transistor 416, for detection node junction 407.*

The specification recites all three of the detection node junctions when describing the readout circuitry, and also uses the plural word “wires” when referring to reference numeral 414, indicating in paragraph [0033] that these wires “are used for interconnecting detection node junctions 406, 407 and 408 with the rest of the circuit components of pixel 400, such as reset transistor 417 and buffer transistor 416, for detection node junction 407.”

Since 37 C.F.R. §1.83 requires that all of the claimed elements must be shown in the drawings, amended FIGS. 2 and 4 are submitted herewith showing the reset and readout-amplifier transistors for each color of the pixel. The specification has been correspondingly amended to describe the revised drawing figures. No new matter has been entered since the specification as originally filed fully supports the amendments to the drawings and the specification.

To conform the specification to the drawing changes to FIGS. 1, 2, and 4, paragraphs [0007], [0025, and [0033] have been amended. As discussed above, no new matter has been presented.

It is respectfully urged that this application is now in condition for allowance. Early favorable consideration of this amendment is respectfully requested.

If the Examiner has any questions regarding this application, the Examiner may telephone the undersigned at 775-586-9500.

Respectfully submitted,
LEWIS AND ROCA, LLP

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/kenneth d'alessandro/

Kenneth D'Alessandro
Reg. No.: 29,144

Lewis and Roca, LLP
1663 Hwy 395, Suite 201
Minden, NV 89423
(775)586-9500
(775)586-9550 Fax